
	<b>INDIAN SCHOOL AL WADI AL KABIR</b>	
<b>Class: XI</b>	<b>Department: SCIENCE 2021 – 22</b> <b>SUBJECT : BIOLOGY</b>	<b>Date of submission</b> <b>13.02.2022</b>
<b>Worksheet No: 17</b> <b>WS WITH ANS.</b>	<b>UNIT: PLANT PHYSIOLOGY</b> <b>RESPIRATION IN PLANTS</b>	<b>Note:</b> <b>A4 FILE</b> <b>FORMAT</b>
<b>NAME OF THE STUDENT</b>	<b>CLASS &amp; SEC:</b>	<b>ROLL NO.</b>

### OBJECTIVE TYPE QUESTIONS- MCQs (1 Marks.)

- Glycolysis is also known as \_\_\_\_\_
  - EMP pathway
  - TCA pathway
  - carbon sequestration
  - None of the above
- On oxidation of 1 molecule of glucose, \_\_\_\_\_ ATP is produced through aerobic respiration
  - 10
  - 25
  - 30
  - 38
- Protons accumulate on the \_\_\_\_\_ in mitochondria.
  - Inner membrane
  - Intermembrane space
  - Outer membrane
  - None of the above
- Oxidative phosphorylation usually refers to \_\_\_\_\_
  - Anaerobic production of ATP
  - Citric acid cycle production of ATP
  - Alcoholic fermentation
  - None of the above
- The process of cell respiration is carried out by \_\_\_\_\_
  - Mitochondria
  - Chloroplast
  - Nucleus
  - None of the above
- An important product of the Krebs cycle is
  - Water
  - Methane
  - ATP
  - None of the above

7. Acetyl CoA forms a 6-C compound after combining with

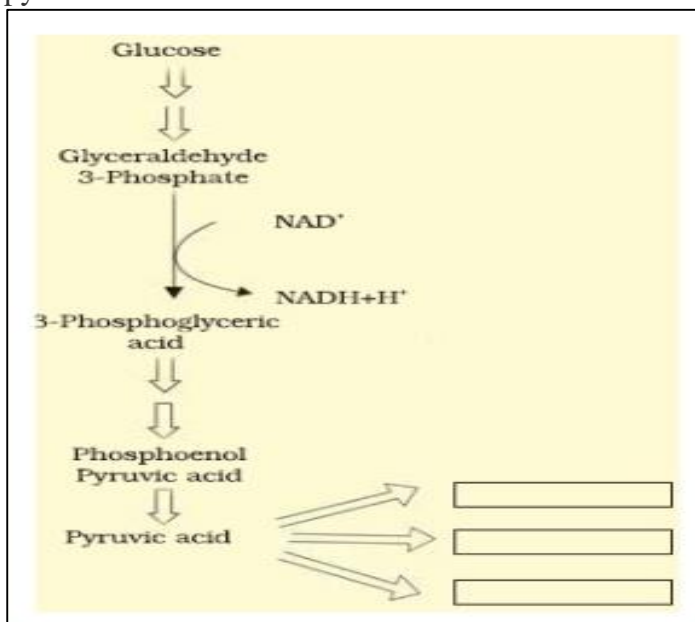
- a) Oxygen
- b) Pyruvic acid
- c) Citric acid
- d) Oxaloacetic acid

**One-line answers -1 mark**

- 8. How is the energy released and stored during oxidation of compounds in respiration?
- 9. What is 'Energy Currency'. Name the substance in animals and plants that act as an energy currency.
- 10. In man and yeast, when does anaerobic respiration take place?
- 11. On oxidation, which of these releases more energy? Organize them in an arranging order.
  - a) 1gm of fat
  - b) 1gm of protein
  - c) 1gm of glucose
  - d) 0.5gm of protein + 0.5gm of glucose
- 12. Fo-F1 particles are involved in the synthesis of?
- 13. What is the product of the following?
  - a) Aerobic glycolysis in skeletal muscle
  - b) Anaerobic fermentation in yeast
- 14. Where is the electron transport system – ETS is located in mitochondria of a cell?
- 15. What is the end product of oxidative phosphorylation?
- 16. Why are mitochondria called the powerhouse of the cell?

**SHORT ANSWER TYPE QUESTION (2 Marks)**

- Q.1. Why is a person fed with glucose or a fruit juice instead of a cheese sandwich that might give more energy, when a person is feeling dizzy?
- Q.2. Aerobic respiration has more efficiency. Justify.
- Q.3. The final product of glycolysis is pyruvic acid. Write the three metabolic fates of the pyruvic acid in anaerobic and aerobic conditions as seen in the diagram below.



Q.4. Anaerobic respiration is observed in entities living such as human and angiosperms in aerobic conditions. Why?

Q.5. State why the respiratory pathway is referred to as an amphibolic pathway.

### LONG ANSWER TYPE QUESTIONS (3 Marks)

Q.1. Explain the significance of Oxygen in aerobic respiration in the context of ETS.

Q.2. What are some of the assumptions we make in the respiratory balance sheet? Are these valid enough to be applied to living systems?

Q.3. State comparisons between aerobic respiration and fermentation corresponding to respiration.

### VERY LONG ANSWER QUESTIONS (5 MARKS)

Q.1. Explain Glycolysis. State where it occurs and its end products. In both aerobic and anaerobic respiration, determine the fate of these product

Q.2. Illustrate the Citric acid cycle.

### ANSWERS/ HINTS

1- a	2-d	3-b	4-b	5-a	6-c	7-d
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A.8. The energy released is directly collected in ATP in the form of chemical bonds.  $ADP + IP + \text{energy} \rightarrow ATP$  This bond is broken and utilized whenever required  $ATP \rightarrow ADP + IP + \text{energy}$

A.9. ATP is known as the energy currency.

A.10. In man, it occurs when there is a lack of oxygen during cellular respiration

In yeasts also, it occurs in the absence of oxygen.

A.11. 1gm of fat releases most energy.

A.12. They are both present in the inner mitochondrial membrane and are involved in the synthesis of ATP which is the energy currency of the cell.

A.13.

a) Pyruvic acid.

b)  $C_2H_5OH + CO_2$

A.14. Inter membrane space – It is the site of oxidative phosphorylation.

A.15. The end product of oxidative phosphorylation is ATP – Adenosine triphosphate and water molecules

A.16. Mitochondria are known as the powerhouse of the cell because they play a vital role in releasing energy from the food molecules through a series of enzyme reactions.

### SHORT ANSWER TYPE QUESTION (2 Marks)

A.1. Glucose gives instant energy as it is absorbed and reaches the blood- As sick people need an immediate energy supply. Cheese sandwich, however, requires time to digest and absorb.,

A.2. In this process, a single molecule of glucose can yield up to 36 ATP molecules. In anaerobic respiration or fermentation, there are only 2 molecules of ATP from every molecule of glucose, which in comparison is lesser than aerobic respiration. Hence aerobic respiration is more efficient.

A.3. Lactic acid – Formed by oxidation of pyruvic acid in skeletal muscles under anaerobic conditions.

Ethanol – Formed by oxidation of pyruvic acid under anaerobic condition in yeasts

Acetyl Co-A – Formed by the oxidation of pyruvic acid occurring within the mitochondria under aerobic conditions.

A.4. In normal conditions in human beings, aerobic respiration takes place.

In intense conditions such as heavy exercises, muscles require too much energy (ATP) hence consume more energy to be able to produce that energy which results in lack of oxygen thereby causing the muscle cells to make lactic acid through anaerobic respiration to meet their energetic needs.

Under deficient conditions of oxygen, yeast cells carry out anaerobic respiration to form ethyl alcohol and carbon dioxide.

A.5. Fatty acids and proteins are degraded to acetyl CoA to enter the respiratory pathway. Substances are withdrawn from the respiratory pathway during the synthesis of fats and proteins and are used in anabolism.

Formation of substances is called anabolism and breakdown of substances is known as catabolism.

Since the respiratory pathway is responsible for both catabolism and anabolism, it is known as the amphibolic pathway.

#### LONG ANSWER TYPE QUESTIONS (3 Marks)

A.1. The aerobic process of respiration occurs in the existence of oxygen and the function of oxygen is limited to the final phase of the process.

Presence of oxygen is important as it drives the process by eliminating hydrogen from the system. Oxygen serves as the last hydrogen acceptor.

In respiration, the energy of oxidation-reduction is used, hence it is called oxidative phosphorylation.

Without oxygen, electrons cannot pass through the co-enzymes and in turn proton pump will not take place hence ATP will not be produced.

A.2. refer pg.234 of the text book

A.3

Fermentation	Aerobic respiration
It is the incomplete disintegration of glucose	A complete breakdown of glucose
Oxidation of NADH to NAD <sup>+</sup> is a slow process	In aerobic respiration, it is a vigorous reaction
2 ATP molecules generated	38 ATP generated

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